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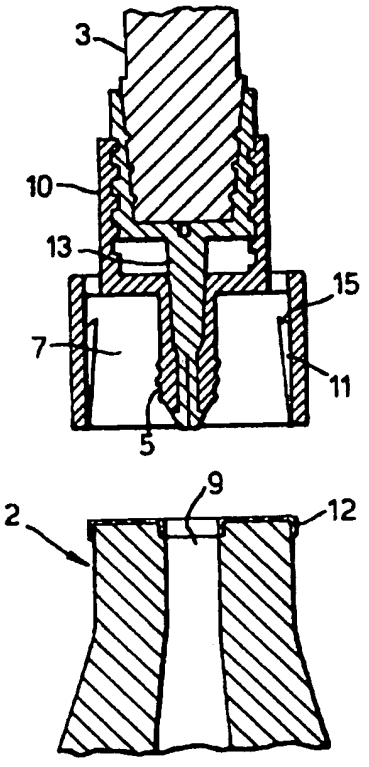
(54) Title: MOPS

(57) Abstract

Apparatus for mounting a core (2) of absorbent mop strip elements on a handle (3) to form a mop, comprising a housing (4) attachable to the mop handle (3) and defining a socket (7) for receiving an end portion of the core (2), and clamping means selectively configurable using configuring means in either of a non-core-clamping configuration in which the core (2) is insertable into and removable from the socket (7) and a core-clamping configuration in which a core (2) received in the socket (7) is securely clamped therwithin. The clamping means comprises an internal clamping member (5) extending axially within the socket (7) for insertion into the end portion of the core (2), and at least one external clamping member (14). When the clamping means are in their core-clampint configuration, the core (2) received in the socket (7) is clamped by radial clamping force between the internal (5) and external (14) clamping members.



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MOPS

This invention relates to mops, that is to say cleaning utensils comprising a handle having mounted at one end thereof a head comprising a bundle of elongate strips of absorbent material. The invention more particularly relates to apparatuses and methods for mounting, preferably releasably mounting, a core of such absorbent mop strip elements securely onto the handle.

Many systems have been proposed for mounting bundles of elongate strip elements onto handles to form mops, which all seek to mount the material securely so that it is not liable to become detached from the handle, even during prolonged, repeated use of the mop. Generally, these known systems utilise two discrete mounting members which are securable to each other and in doing so clamp a portion of each strip of absorbent material between them, one of the mounting members being additionally formed for mounting on the end of a mop handle.

One such known mop head mounting system relies upon a plurality of laminar mop strip elements, each of which is formed with a respective centrally located aperture. The strip elements are arranged in a star-like configuration, one on top of the other, so that the apertures in their respective central portions are all aligned. Then a prong projecting from a male mounting member is passed through the apertures and securely bonded to a female mounting member, which is subsequently

mounted on a mop handle.

This known system suffers from several disadvantages. Firstly, the apertures in the strip elements constitute areas of weakness, at which the material may wear and tear through prolonged use of the mop. Secondly, no simple mechanism exists for renewing the strip elements when they are worn out, since the male and female mounting members are not adapted for, and may not even permit, disconnection to allow the worn out mop elements to be removed, nor for reassembly with a new set of mop strip elements clamped between them. Furthermore, positioning a replacement set of the mop strip elements with their respective apertures in alignment and in a star-like configuration, as this known system demands, would be too technically specialised and laborious a task for a user of the mop to carry out by hand in a simple and quick manner. Consequently, it is necessary to replace the complete mop when the strip elements become worn or damaged. This is both costly to the user and environmentally unsound.

In the art of mop head attachments there are known various other types of mechanical fixings by which a bundle of mop strip elements are clamped together and mounted on the end of a mop handle. All of these systems generally rely upon the same mechanical operation, namely the clamping of the strips between a pair of clamping members which are secured together, often permanently. In some examples, the strips are arranged parallel to

each other in a tight, cylindrical core bundle with the clamping effected in an end region thereof, whereas in other examples the clamping is effected at a central region of a similarly constructed cylindrical core oriented transverse relative to the direction of the mop handle, with the mop elements emerging from and hanging down from either side of the head fixing.

In another known arrangement, the cylindrical core is formed as a vertically oriented coil from a single web of the absorbent material, the web being pre-cut with a plurality of slits extending upwards into the web from its lower edge to form the individual mopping strips in the finished coiled head. The coiled core is clamped at its top region by, for example, a pin or spike which penetrates that core region and also provides lateral fixing lugs or the like by which the core can be mounted onto a mop handle, or alternatively it is clamped by virtue of the web being provided with a series of perforations along and adjacent its upper edge through which spoke-like extensions of a mounting head member protrude as the web of material is wound up on itself therearound to form the coiled core.

All of these known alternative fixing arrangements however suffer from similar disadvantages as discussed above and do not provide for a cheap, easy and environmentally friendly means by which mop heads can be renewed or replaced when required.

A further known form of mop head attachment is described and illustrated in EP-A-0259279. In contrast to most other known mop strip element mounting arrangements, this further known system utilises an integral moulding technique to simultaneously bond the bundle of strip elements together at one end thereof and also provide a means of attachment to a mop handle. In the disclosed process a parallel, cylindrical bundle of individual strip elements are clenched together, one end of the bundle is placed in a mould and a body of plastics material is injected into the mould to form an integrally moulded head with the ends of the strips embedded therein. Whilst this system provides for a quick and easy mop head replacement facility, it suffers from the greater disadvantage of expense, wastage of plastics raw material and environmental unfriendliness, given that the mopping strips and the head attachment are integrally formed and thus must be disposed of together when the mop head has reached the end of its working life.

The present invention seeks to overcome at least some of the above problems and provide a system by which a core of absorbent elongate mop strip elements can be quickly, easily and securely mounted on a mop handle so that the strength and durability of the absorbent material is optimised, wherein the core is readily releasable from the handle for the purpose of cheap, easy, and environmentally friendly replacement with minimal wastage of raw materials from which the mop head is constructed.

Accordingly, in a first aspect the invention provides an apparatus for mounting a core of absorbent strip elements on a handle to form a mop, comprising:

a housing attachable to the mop handle and defining a socket for receiving an end portion of the core; and

clamping means selectively configurable in either of a non-core-clamping configuration in which the core is insertable into and removable from the socket and a core-clamping configuration in which a core received in the socket is securely clamped therewithin;

wherein said clamping means comprises at least one internal clamping member extending axially within the socket for insertion into the end portion of the core of strip elements, at least one external clamping member, and configuring means for selectively configuring one or other or both of said internal and external clamping members into said non-core-clamping configuration or said core-clamping configuration, whereby when the clamping means are in said core-clamping configuration, a core received in the socket is clamped by radial clamping force between the internal and external clamping members.

As used herein, the term "core" is to be understood as meaning any physical arrangement of mop strip elements which includes an end portion suitable for or adapted for insertion into the socket of the apparatus of the invention. The core may comprise a plurality of discrete, parallel arranged, elongate strip elements arranged into a generally cylindrical bundle or more practically may comprise a coil of a single web of the

absorbent material which is wound up on itself and pre-cut with a plurality of slits extending into the web from and transverse to its lower edge. In either case the core may be held together, especially prior to insertion into the socket, by any suitable binding means which prevents the bundle of strips collapsing or become disarranged or the coiled-up strip from unwinding. Such binding means may be for example a length or band of adhesive tape or paper (or the like) or shrink-wrap plastics material applied to the exterior periphery of the end portion of the core or alternatively may be adhesive applied to the interior of the core, i.e. to the end portions of individual strips or to one or both surfaces of the end portion of the single web of strip material, prior to or during the formation of the core itself. Such binding means helps to maintain the core as a tight bundle of strips which is readily storable, transportable and manipulatable as and when required.

In accordance with this invention, the core may even be an integral moulded core such as that known from EP-A-0259279 referred to above, though this is less preferred for reasons already discussed.

A primary advantage of the apparatus of the invention is that a core of mop strip elements clamped within the socket can be easily renewed by a user by configuring the clamping means into the non-core-clamping configuration, removing the core from the socket by axial displacement so as to extract the internal clamping

member from the end portion of the core, inserting a new core into the socket by opposite axial displacement so as to insert the inner clamping member into the end portion of the new core, and once more configuring the clamping means into the core-clamping configuration. A further advantage of the invention is that replacement of the core involves minimal wastage of raw materials from which the mop head is constructed, with associated lower cost and environmentally improved long term impact.

In some forms of the apparatus of the invention, the clamping means are configured into their core-clamping configuration by generally radially outward deformation of the or each internal clamping member into an expanded state. For example, the internal clamping member, which is preferably a single such member disposed centrally within the socket, may comprise a rawlplug-like member comprising two or more resilient fingers united at one end thereof but separated along at least part of their length by a gap, so that the plug member can be expanded by the insertion of a prong, spike, screw or similar element which may thus constitute the configuring means. The latter may be provided as a separate constructional element or, more preferably, may be provided on the mop handle itself, so that expansion of the internal clamping member to effect clamping of the core is effected by the action of actually mounting the apparatus onto the mop handle.

In other forms of the apparatus of the invention,

the clamping means are configurable into their core-clamping configuration by generally radially inward deformation of the external clamping member or members.

The external clamping member or members may be formed either as part of the housing or alternatively as part of a discrete clamping ring which encircles the inner clamping member and which may be disposed at least partially internally or alternatively externally of the housing.

In the first case, where the external clamping member(s) are formed as part of the housing, they are preferably formed as radially inwardly projecting resilient barbs, teeth, claws or other gripping elements, preferably integral with the main body of the socket, which naturally assume a non-core clamping configuration. For the purpose of deforming these gripping elements into their core-clamping configuration, the configuring means preferably takes the form of a collar external to the socket and moveable axially or rotationally or both, for example using screw threaded means, relative thereto to bring one or more abutment surfaces provided thereon into abutting engagement with the gripping elements and so urge them radially inwardly into the socket interior to clamp a core situated therein.

In the second case, where the external clamping member(s) are provided by a discrete clamping ring or the like, the clamping ring is formed with again preferably

a plurality of radially inwardly projecting barbs, teeth, claws or other gripping elements, which may themselves be resiliently deformable in order to provide the dual configuration capability or otherwise the main body of the clamping ring itself may be resiliently deformable to serve the same function. In some embodiments, the clamping ring may be disposed with at least that part thereof which carries the gripping elements situated within the socket, with a portion of the housing itself forming the configuring means which urges the gripping elements radially into the socket interior upon mutual abutting engagement of respective abutment surfaces or surface formations on the clamping ring and the housing as the two are displaced axially or rotationally or both relative to one another. In other embodiments, the clamping ring may be disposed externally of the housing, in which case the housing is provided with one or more, or respective, apertures through which the gripping elements can protrude into the socket interior to clamp a core situated therewithin. In this arrangement, the configuring means are constituted preferably by interacting abutment surfaces on the housing and the clamping ring which are displaceable axially or rotationally or both relative to one another. Under such relative movement the gripping elements of the clamping ring may be either withdrawn from their respective apertures in the housing to abut the exterior of the main housing body (their non-core clamping configuration) or allowed to protrude into the housing interior through their respective apertures (their core-clamping

configuration). Accordingly, in this arrangement it is preferred that the clamping ring is constructed and arranged such that the gripping elements naturally assume their core-clamping configuration. Alternatively, however, the opposite could be the case, with a separate external locking sleeve or the like being provided to configure the gripping elements from their normally non-core-clamping configuration into their core- clamping configuration once they are brought into register with their respective apertures in the housing.

As already mentioned, in some embodiments of the apparatus of the invention, the clamping means are configured into their core-clamping configuration by the action of attaching the housing to the mop handle. This applies particularly to the case where the core clamping action is provided at least by radially outward expansion of the internal clamping member and may also apply to the case in which the core-clamping action is provided by the external clamping member(s). In both cases, the housing in such embodiments preferably comprises a handle-receiving portion into which an end portion of the handle can be received, and which allows for penetration therethrough of the configuring means either into the internal clamping member or to engage the external clamping member(s) to configure them into their core-clamping configuration.

In further embodiments of the apparatus of the invention, the configuring means are independently

operable subsequent to attachment of the mop handle to the housing, such that a core can be clamped in the socket in a two-stage process, in the first of which the core is inserted into the socket and the internal clamping member inserted into the end portion of the core, and in the second of which the configuring means are actuated by the user to configure the clamping means into their core-clamping configuration.

In other embodiments of the apparatus of the invention, the clamping means are configured into their core-clamping configuration by the action of inserting the core of mop strip elements into the socket of the housing. For example, the apparatus may be so constructed that as the core is fully inserted into the socket, the configuring means are configured into their core-clamping configuration.

Preferably, anchoring means are provided within the socket of the housing for ensuring that the core of mop strip elements remains correctly positioned within the socket during use of the mop, and especially for preventing rotation of the core therein. The anchoring means may, for example, comprise longitudinal ridges projecting inwardly into the socket interior.

To assist the central location of the core within the socket and possibly also the anchoring action, the internal clamping member may be formed with transverse or longitudinal ridges or other surface formations

projecting outwardly into the socket interior, or may even have a cruciform or similarly functioning cross-section.

Conveniently, the entire, or at least a substantial part of the, mounting apparatus of the invention may be formed, especially by a moulding process, from plastics material, suitable examples of which are well known in the art of mop head attachments.

In a second aspect, the present invention provides a mop comprising:

a handle;

a core of absorbent strip elements; and

an apparatus for mounting said core of absorbent elements on said handle, said apparatus comprising:

a housing attached to the handle and defining a socket in which is received an end portion of the core; and

clamping means selectively configurable in either of a non-core-clamping configuration in which the core is insertable into and removable from the socket and a core-clamping configuration in which the core is received in and securely clamped within the socket;

wherein said clamping means comprises at least one internal clamping member extending axially within the socket and inserted into an end portion of the core of strip elements, at least one external clamping member, and configuring means for selectively configuring one or other or both of said internal and external clamping

members into said non-core-clamping configuration or said core-clamping configuration;

the clamping means in the finished mop ready for mopping use being in said core-clamping configuration, whereby the core is received in and securely clamped in the socket by radial clamping force between the internal and external clamping members.

In a third aspect, the invention provides a method of forming a mop, comprising the steps of:

providing a handle, a core of absorbent strip elements, and a mounting apparatus according to the first aspect of the invention;

configuring the clamping means of said mounting apparatus in their non-core-clamping configuration;

inserting an end portion of said core into the socket of said mounting apparatus and the internal clamping member of said mounting apparatus into the end portion of said core of strip elements; and

configuring the clamping means in their core-clamping configuration, whereby said core is securely clamped within the socket by radial clamping force between the internal and external clamping members of the mounting apparatus.

Embodiments of the various aspects of the invention will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view of part of a first embodiment of the mop of the invention;

Figure 2 is an axial cross-sectional view of the embodiment of Figure 1, showing the clamping means in the non-core-clamping configuration;

Figure 3 is an axial cross-sectional view of the embodiment of Figure 1, showing the clamping means in the core-clamping configuration;

Figure 4 is an exploded perspective view of a second embodiment of the mop of the invention;

Figure 5 is an axial cross-sectional view of the embodiment of Figure 4, showing the clamping means in the non-core-clamping configuration;

Figure 6 is an axial cross-sectional view of the embodiment of Figure 4, showing the clamping means in the core-clamping configuration;

Figure 7 is an exploded perspective view of a third embodiment of the mop of the invention;

Figure 8 is an axial cross-sectional view of the embodiment of Figure 7, showing the clamping means in the non-core-clamping configuration;

Figure 9 is an axial cross-sectional view of the embodiment of Figure 7, showing the clamping means in the core-clamping configuration;

Figure 10 is an exploded perspective view of a fourth embodiment of the mop of the invention;

Figure 11 is a transverse cross-sectional view of the embodiment of Figure 10, showing the process by which claws of the external clamping member are deformed into gripping relationship with the core by rotation of a locking ring;

Figure 12 is an axial cross-sectional view of the

embodiment of Figure 10, showing the clamping means in the core-clamping configuration;

Figure 13 is an exploded perspective view of a fifth embodiment of the mop of the invention;

Figure 14 is an axial cross-sectional view of the embodiment of Figure 13, showing the clamping means in the non-core-clamping configuration;

Figure 15 is an axial cross-sectional view of the embodiment of Figure 13, showing the clamping means in the core-clamping configuration;

Figure 16 is an exploded perspective view of a sixth embodiment of the mop of the invention;

Figure 17 is an axial cross-sectional view of the embodiment of Figure 16, showing the clamping means in the non-core-clamping configuration; and

Figure 18 is an axial cross-sectional view of the embodiment of Figure 16, showing the clamping means in the core-clamping configuration.

Referring firstly to Figure 1, a first embodiment of a mop according to the invention is shown comprising a housing 4 defining a handle-receiving portion 10 into which an end portion of a mop handle 3 is partly inserted. The end portion of the handle 3 and the inner surface of the handle receiving portion 10 are both screwthreaded to provide a secure connection, and the handle 3 is additionally formed with one or more detent lugs 8 which fit into detent holes (not shown) on the inner surface of the handle receiving portion 10.

In Figure 1 the apparatus of the invention is shown in combination with a core 2 of elongate, absorbent mop strip elements formed with an integrally moulded head 12 of plastics material at its upper end region, whereby the strip elements are united together. Alternatively, the strip elements may be bound together by other suitable means, for example, a length or band of adhesive tape or paper or shrink wrap plastics material applied to the exterior periphery of the end portion of the core 2 or by adhesive applied to the strip layers of the core during the formation thereof. The core 2 includes a centrally located, generally cylindrical channel 9 therein for accommodating an inner clamping member 5 of the apparatus, as described further below. This channel 9 may be formed during production of the core itself, especially where, as in this embodiment, the core is formed with an integral head moulding, or may be formed in a post-production step. In embodiments where a non-moulded core is used, it may be sufficient simply for the collection of mop strips to be clenched together sufficiently loosely for the internal clamping member to be insertable with the centre of the core by pressure alone.

The housing 4 comprises a skirt 14 (shown partly cut away in Figure 1) which defines a socket 7 for receiving an end portion of the core 2. Extending axially into the socket 7 from the roof of the housing 4 is an internal clamping member 5 which resembles a rawplug in form, construction and function, as is well known in the

art of mechanical fixings. The plug member 5 is insertable into the aperture 9 in the end of the core 2 as the latter is received in the socket 7.

As is seen more clearly in Figures 2 and 3, the end of the handle 3 is formed with a prong 13 extending longitudinally therefrom. After the core 2 has been fully inserted into the socket 7 and the plug 5 located inside the channel 9 in the core 2, the handle 3 is fully inserted into the handle-receiving portion 10 of the housing 4, in this instance by a screwing action, thereby forcing the prong 13 into the interior of the plug 5. This causes the plug 5 to expand by radially outward deformation of its resilient fingers, and thus clamp the core 2 against the inner surface of the skirt 14, as shown in Figure 3.

Transversely oriented ribs 19 (Figure 1) are provided on the exterior surface of the plug 5 to better centralise the plug 5 within the channel 9 and preferably also to assist the retention of the core 2 within the socket 7. The inner surface of the skirt 14 is formed with a plurality of longitudinal ridges 11 which dig into the core 2 when the mounting apparatus is in the core-clamping configuration and thus hinder rotation of the core 2 within the socket 7.

Figures 2 and 3 furthermore show the process by which the core 2 is mounted on the handle 3. In Figure 2, the clamping means of the apparatus are shown in their

non-core-clamping configuration, in which the handle 3 is only partially inserted into the handle-receiving portion 10 of the housing 4, and the core 2 is not inserted into the socket 7. Figure 3 shows the core 2 inserted into the socket 7, and the handle 3 fully inserted into the handle-receiving portion 10 of the housing 4, whereby the prong 13 has been forced fully into the interior of the plug 5, thus expanding it to clamp the end portion of the core 2 against the interior skirt walls of the socket 7.

Barbs 15 at the respective upper ends of the longitudinal ridges 11 (i.e. the ends nearest the handle receiving portion 10 of the housing 4) dig into the core 12, thus helping to retain it within the socket 7.

Turning now to Figure 4, a second embodiment of the mounting apparatus of the invention comprises a clamping ring 20 formed with a plurality of radially inwardly projecting barbs or other gripping elements 21. The clamping ring 20 is inserted into the socket 7 of the housing 4 in a first (i.e. non-clamping) position (shown in Figure 5), in which its upper section only protrudes into the socket 7. The lower section of the clamping ring 20 is formed with a plurality of notches 25 in its outer surface which facilitate rotation of the clamping ring 20 within the socket 7. Screwthreads 16 on the exterior surface of the clamping ring 20 engage corresponding screwthreads on the inner surface of the skirt 14 so that the clamping ring is drawn up into the socket 7 into a second (i.e. clamping) position therein

(shown in Figure 6) as the two are screwed together relative to one another. In the second position, a resilient detent portion 27 of the screwthread 16 projects through a detent aperture 24 in the skirt 14, and so serves to retain the clamping ring 20 in the second position until the detent portion 27 is inwardly deformed (for example by the user) to allow the clamping ring to be removed by unscrewing from the housing 4.

As the clamping ring 20 moves into the second position, the barbs 21 projecting inwardly from the clamping ring 20 are deformed inwardly by a frustoconical abutment surface 22 on the inside of the socket 7, and are thus urged into the core 2 received within the socket, thereby clamping it against the internal clamping member 6. During this step, the barbs 21 also help to lift the core 2 fully into the socket 7, whereby an optional widened portion 26 of the inner member 6 enters the end portion of the core 2, deforming it radially outwards and so further assisting the clamping action against the inner surface of the skirt 14.

Figures 7, 8 and 9 show a third embodiment of the mounting apparatus of the invention, which comprises a locking collar 30. Once a core 2 is positioned in the socket 7, the locking collar 30 is slid axially from a first, non-clamping position (shown in Figure 8) proximate the handle-receiving portion 10 of the housing 4 into a second, clamping position (shown in Figure 9) proximate the open end of the socket 7, where it

abuttingly engages a plurality of claws 32 which are formed with integral resilient connections to the body of the housing are equally spaced around the socket 7. Thus, the claws 32 are urged radially inwards into the core 2, thereby clamping the core 2 against the inner clamping member 6. The clamping action is enhanced by the provision of a plurality of axial ridge elements 31 provided on the socket interior wall.

Figures 10, 11 and 12 show a fourth embodiment of the mounting apparatus of the invention, which comprises a locking collar 41 which can be rotated around the exterior of the skirt 14 of the housing between locked and unlocked positions. A shoulder 47a formed at the lower periphery of the skirt 14 and a circumferential bead 47b formed at the upper periphery of the skirt 14 prevent the locking collar 41, which is axially located between the shoulder 47a and bead 47b, from becoming detached from the skirt 14. The shoulder 47a further provides an annular seat upon which the collar 41 rests as it is rotated. Either or both of the collar 41 and the skirt 14 may be resiliently deformable such that the collar 41 can be snapped over the bead 47b during assembly of the mounting apparatus.

Formed by a partially cut-out windows in the wall of the skirt 14 are a plurality of equispaced gripping elements 42, each of which is joined at one end to the housing body via an integral resilient connection and

naturally assumes a non-clamping configuration in which its end distal to its connection to the housing is retracted from the interior of the socket. Spaced circumferentially to either side of each gripping element is each of a respective pair of external stop ridges 49 which define the rotational limits of the locking collar 41 between its unlocked and locked positions. For this purpose, the locking collar 41 has protruding radially inwardly from its inner wall, at equispaced locations corresponding to those of the gripping elements, respective stop lugs 48, the sides of which abut respective stop ridges 49 at each of the rotational limiting positions of the collar 41 defined thereby. As the locking collar 41 is rotated (clockwise in this illustrated embodiment) from its unlocked limiting position (as shown in Figure 11) into its locked limiting position (as shown in Figure 12), each of the stop lugs 48 abuts and advances across the outer surface of a respective gripping element 42, and in doing so urges it increasingly radially inwards (represented by arrows 43) about its resilient hinge-like connection to the skirt, until the locked limiting position is reached, at which the distal end of the gripping element is pushed to the maximum extent possible inwards towards the socket interior. In this position each of the gripping elements assumes its maximum core-clamping configuration, as shown in Figure 12.

Each of the gripping elements 42 has one or more surface formations 50 such as barbs, ridges, teeth or

such like, on its inner surface at or adjacent its distal end, for optimising its gripping and clamping function against a core which is received with the socket in a similar manner as in the other embodiments described above prior to actuation of the clamping mechanism.

Figures 13, 14 and 15 show a fifth embodiment of the mounting apparatus of the invention, which comprises housing 4 having a substantially cylindrical skirt 52, and generally cylindrical inner clamping body 54, which is insertable into the housing 4 as the core of mop elements 2 is inserted into the socket 7, which in this embodiment is defined within the clamping body 54 as shown in Figures 14 and 15. The clamping body 54 comprises a frustoconical skirt 53 (Figure 14), the maximum external diameter of which is that at the lower end thereof and which is greater than the maximum internal diameter of the cylindrical skirt 52 of the housing 4. The frustoconical skirt 53 of the clamping body 54 has one or more axial slits 51 formed therein (Figure 13) extending from the lower peripheral edge thereof towards an upper region thereof, as shown in the Figure, whereby the frustoconical skirt 53 is resiliently deformable in a radial direction. As the clamping body 54 is inserted into the socket 7, the inner surface of the cylindrical skirt 52 abuts the outer surface of the frustoconical skirt 53 and forces it radially inwardly, thereby urging the slit(s) 51 to close, and thus causing barbs 56 projecting radially inwardly from the clamping body 54 to dig into the core 2 to clamp it against the

inner clamping member 6 which protrudes into the end portion of the core as in the other embodiments described above.

Upon full insertion of the clamping body 54 within the socket 7, resilient detent elements 58 extending generally axially alongside the clamping body wall from their integral connections to the lower periphery of the clamping body 54 come into register with respective detent apertures 59 in the skirt 14, and project therethrough, thus securely retaining the clamping body 54 within the socket 7. By resiliently deforming the detent elements 58 radially inwards, a user can release them from the detent apertures 59, thus enabling the clamping body 54 to be released from the socket 7.

To facilitate the desired rotational positioning of the clamping body 54 within the housing 4 so that the detent elements 58 can be brought into register with their respective detent apertures 59 by simple axial relative movement, one or more slots 57 are provided in the skirt 14 along which one or more respective guide lugs 55 of the clamping body 54 slide as the clamping body moves between its core-clamping and non-core-clamping positions. Preferably, the upper and lower ends of the or each slot 57 are closed, so that the range of relative axial movement of the clamping body 54 and the housing 4 is limited, and so that the clamping body 54 cannot be completely detached from the housing 4.

Figures 16, 17 and 18 show a sixth embodiment of the mounting apparatus of the invention, which comprises a housing 4 having a handle-receiving portion 60, the inner surface of which is appropriately screwthreaded to receive a correspondingly screwthreaded end portion of mop handle 3.

Defined by the housing 4, is a core-receiving socket 7 which accommodates clamping body 62 (seen more clearly in Figure 17) formed with a plurality of inwardly projecting teeth 64. The clamping body 62 has a non-core-clamping configuration (shown in Figure 17) in which a core of mop strip elements 2 (as before received) within the socket 7 is not clamped, and an axially displaced core-clamping position (shown in Figure 18) in which the teeth 64 are inwardly deformed by abutment surfaces 68 of the mouth region of the housing 4, and thus driven into the core 2 to effect secure clamping thereof. The clamping body 62 is configured into the core-clamping position by insertion of end portion 65 of mop handle 3 into a handle-receiving portion 60 of the housing using a screwing action, such that the screwthreaded portions of the handle receiving portion 60 and mop handle 3 engage one another and the end portion 65 of the mop handle 3 is drawn into the handle receiving portion 60, whereby the tip of the handle 3 abuttingly engages an upstanding extension 67 of the clamping body 62 and forces the clamping body 62 axially downwards into its core-clamping position, as a result of which action the teeth elements 64 of the clamping body are urged

radially inwardly by the action of housing abutment surfaces 68, as mentioned above.

Slots 66 are preferably provided in the housing 4 along which lugs 69 formed on the clamping body 62 can slide, in a similar manner to the corresponding lugs/slots in the fifth embodiment described above with reference to Figures 13 to 15. Thus, the lugs 69 ensure that the clamping body 12 can only be moved in an axial direction and that it cannot be removed from the socket 7.

Various embodiments of the invention have been described above by way of example only and it is to be understood that many variations and modifications from what has been specifically described and/or illustrated are possible within the scope of the invention as claimed, as will be clear to persons skilled in the art.

CLAIMS:

1. An apparatus for mounting a core of absorbent strip elements on a handle to form a mop, comprising:

a housing attachable to the mop handle and defining a socket for receiving an end portion of the core; and

clamping means selectively configurable in either of a non-core-clamping configuration in which the core is insertable into and removable from the socket and a core-clamping configuration in which a core received in the socket is securely clamped therewithin;

wherein said clamping means comprise at least one internal clamping member extending axially within the socket for insertion into the end portion of the core of strip elements, at least one external clamping member, and configuring means for selectively configuring one or other or both of said internal and external clamping members into said non-core-clamping configuration or said core-clamping configuration, whereby when the clamping means are in said core-clamping configuration, a core received in the socket is clamped by radial clamping force between the internal and external clamping members.

2. Apparatus according to claim 1, in which said clamping means are configured into said core-clamping configuration by radially outward deformation of the or each internal clamping member into an expanded state.

3. Apparatus according to claim 1 or claim 2, in which said clamping means are configured into said core-

clamping configuration by radially inward deformation of the or each external clamping member.

4. Apparatus according to any one of claims 1 to 3, in which the external clamping member(s) comprise gripping elements projecting radially inwardly of the housing.

5. Apparatus according to claim 4, in which the configuring means comprises a collar external to the socket and moveable axially and/or rotationally relative thereto to bring one or more abutment surfaces provided thereon into abutting engagement with the gripping elements and so urge them radially inwardly into the core-clamping configuration.

6. Apparatus according to any one of claims 1 to 3, in which the external clamping member(s) comprise radially inwardly projecting gripping elements provided on a clamping ring, said configuring means being operable to deform said clamping ring and/or said gripping elements so as to urge them into a said core received in the socket.

7. Apparatus according to claim 6, in which the clamping ring is disposed with at least that part thereof which carries said gripping elements situated within the socket, a portion of the housing itself forming the configuring means which urges the gripping elements radially into the socket interior upon mutual abutting engagement of respective abutment surfaces or surface

formations on the clamping ring and the housing as the two are displaced axially or rotationally relative to one another.

8. Apparatus according to claim 6, in which the clamping ring is disposed externally of the housing and the housing is provided with one or more, or respective, apertures through which the gripping elements can protrude into the socket interior to clamp a core situated therewithin.

9. Apparatus according to any preceding claim, in which the clamping means are configured into said core-clamping configuration by the action of attaching said handle to said housing.

10. Apparatus according to any one of claims 1 to 8, in which the clamping means are configured into said core-clamping configuration by the action of inserting said core into said socket.

11. Apparatus according to any preceding claim, further including means for preventing rotation of said core within said socket.

12. Apparatus substantially as any hereinbefore described with reference to the accompanying drawings.

13. A mop comprising:

a handle;

a core of absorbent strip elements; and

an apparatus for mounting said core of absorbent elements on said handle, said apparatus comprising:

a housing attached to the handle and defining a socket in which is received an end portion of the core; and

clamping means selectively configurable in either of a non-core-clamping configuration in which the core is insertable into and removable from the socket and a core-clamping configuration in which the core is securely clamped within the socket;

wherein said clamping means comprises at least one internal clamping member extending axially within the socket and inserted into an end portion of the core of strip elements, at least one external clamping member, and configuring means for selectively configuring one or other or both of said internal and external clamping members into said non-core-clamping configuration or said core-clamping configuration;

the clamping means in the finished mop ready for mopping use being in said core-clamping configuration, whereby the core is securely clamped by radial clamping force between the internal and external clamping members.

14. A mop according to claim 13, in which the core of absorbent strip elements comprises a coil of a single web of absorbent material wound up on itself and pre-cut with a plurality of slits extending into the web from and transverse to its lower edge.

15. A method of forming a mop, comprising the steps of:

providing a handle, a core of absorbent strip elements, and a mounting apparatus according to claim 1;

configuring the clamping means of said mounting apparatus in the non-core-clamping configuration;

inserting an end portion of said core of strip elements into the socket of said mounting apparatus;

inserting the internal clamping member of said mounting apparatus into the end portion of said core of strip elements; and

configuring the clamping means in the core-clamping configuration, whereby said core is securely clamped within the socket by radial clamping force between the internal and external clamping members of the mounting apparatus.

Fig.1.

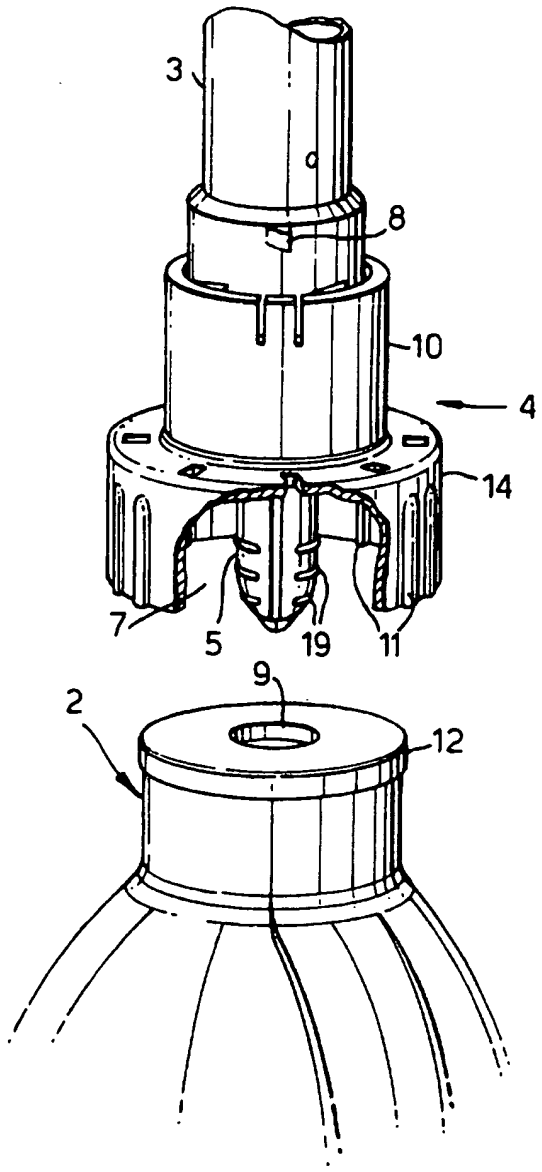


Fig.2.

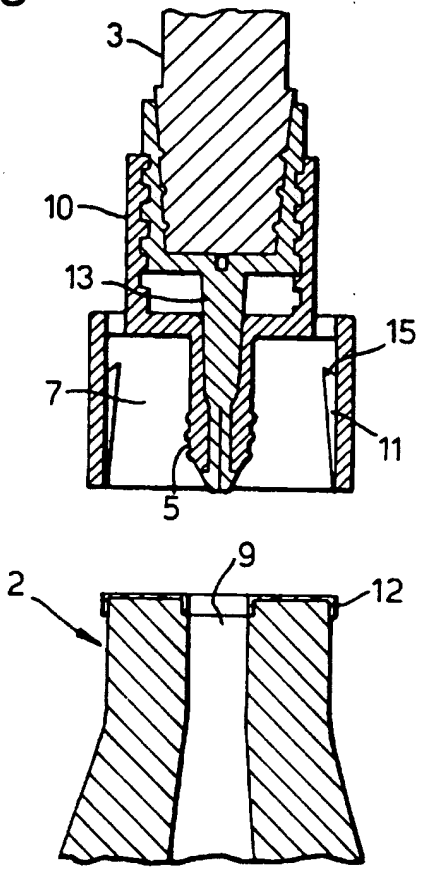


Fig.3.

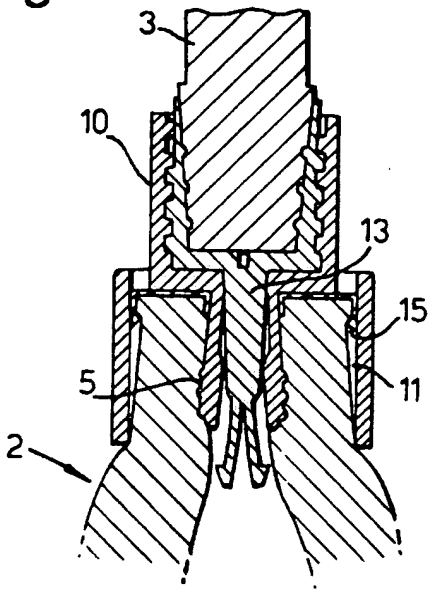


Fig.4.

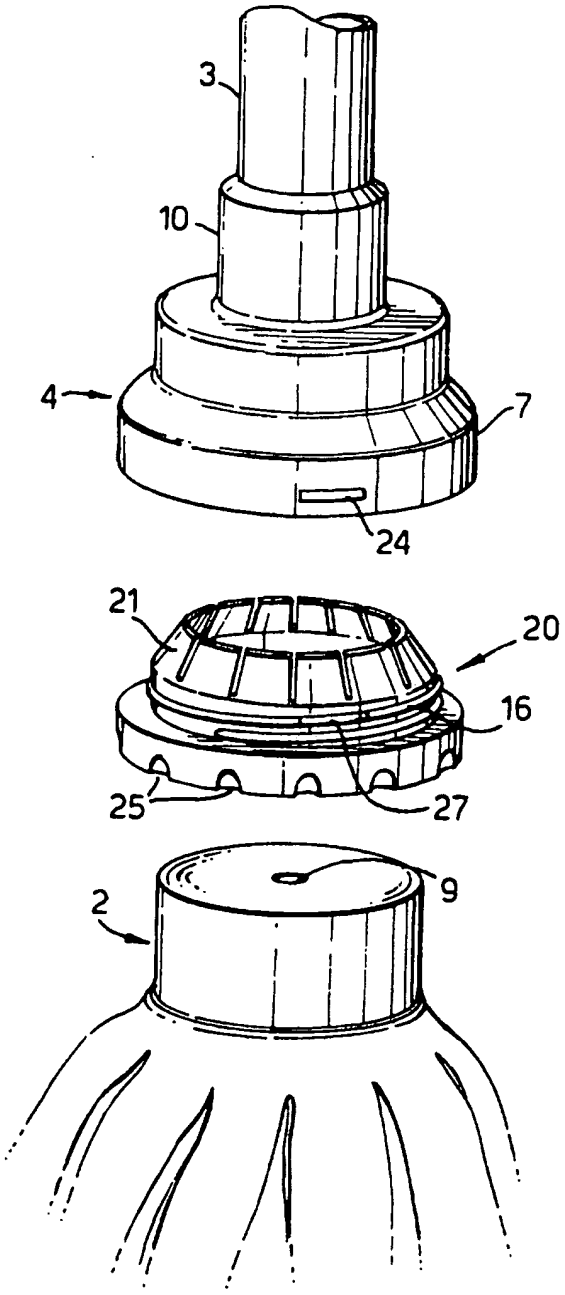


Fig.5.

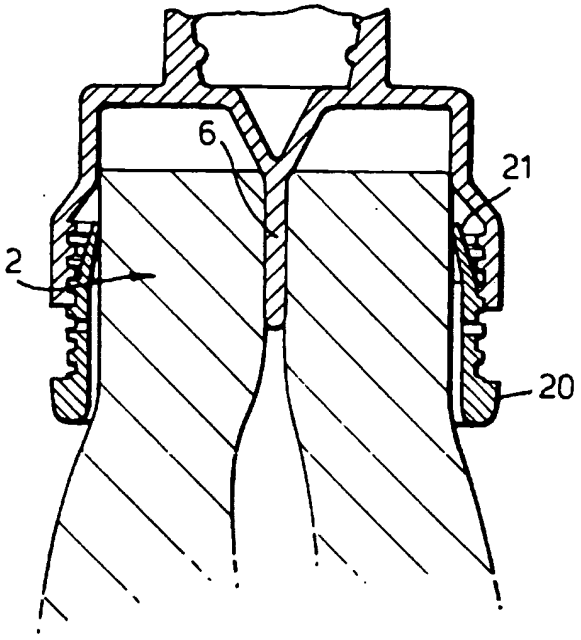


Fig.6.

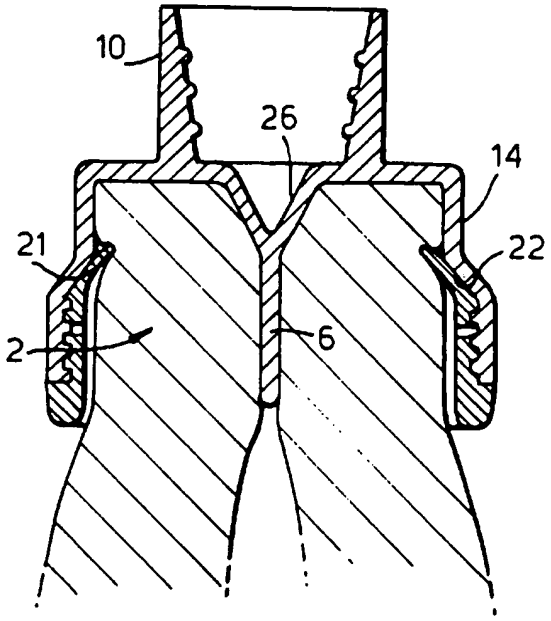


Fig.7.

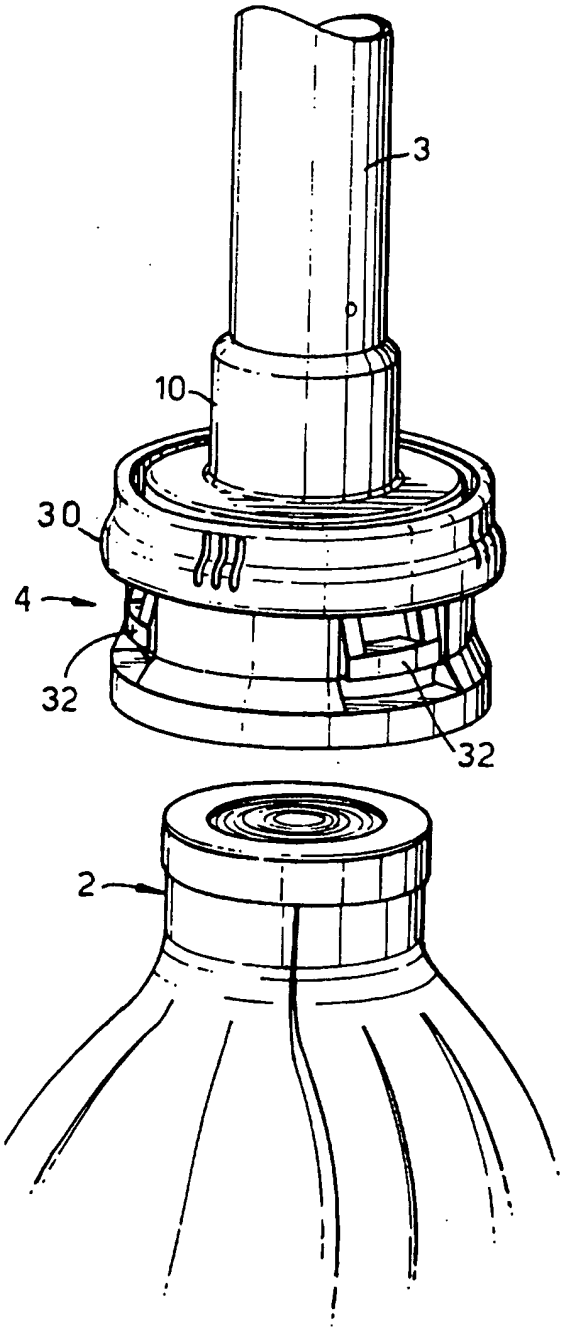
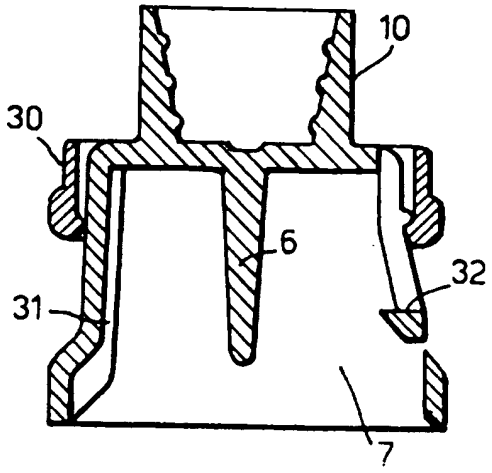


Fig.8.



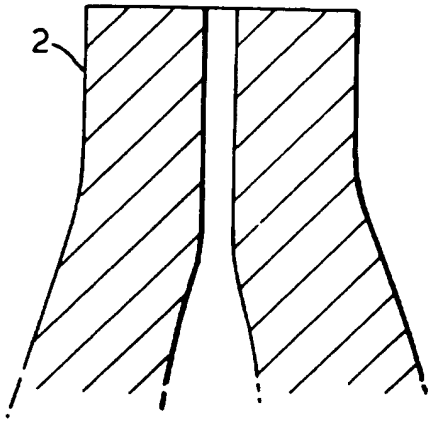


Fig.9.

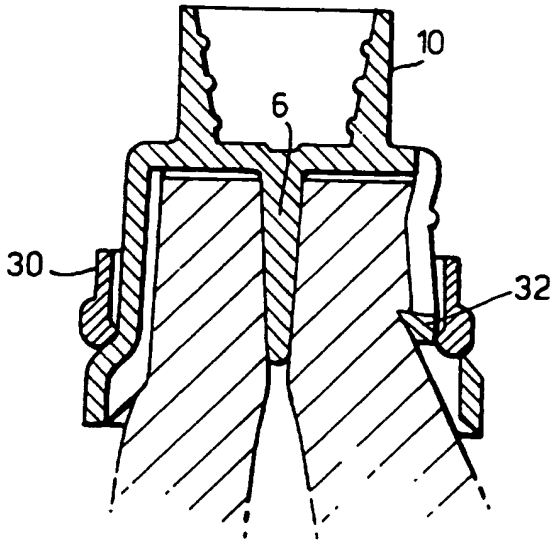


Fig.10.

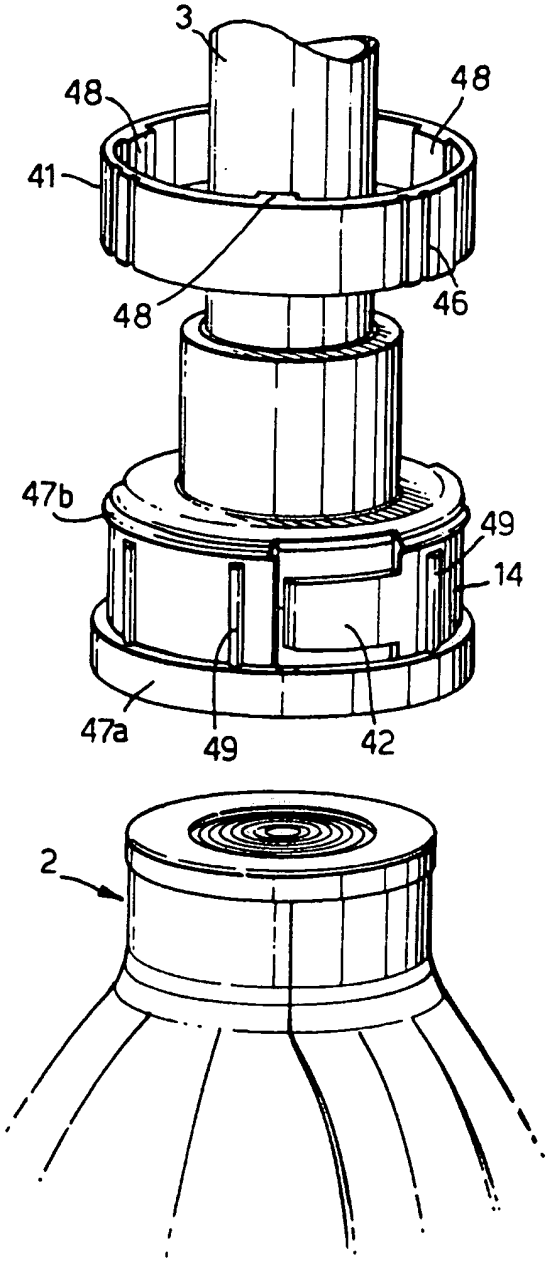


Fig.11.

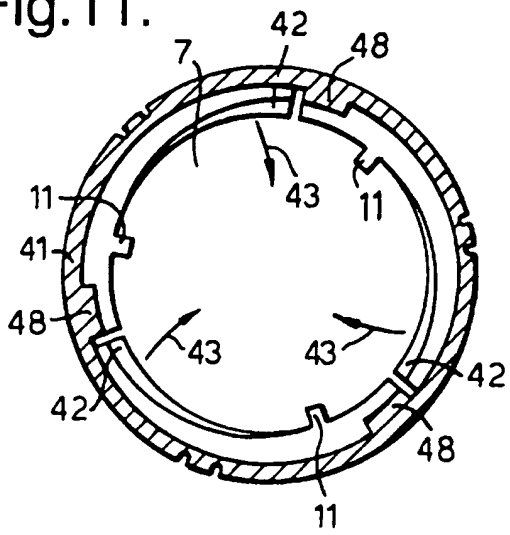


Fig.12.

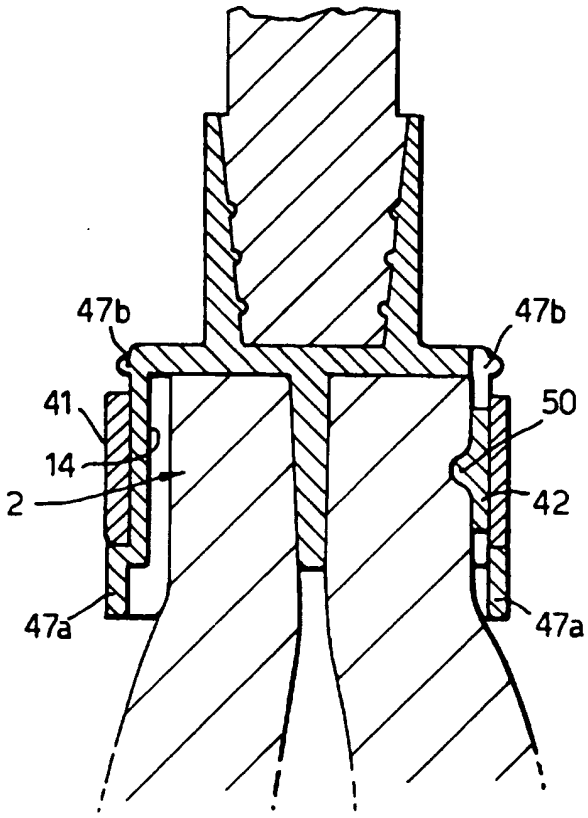


Fig.13.

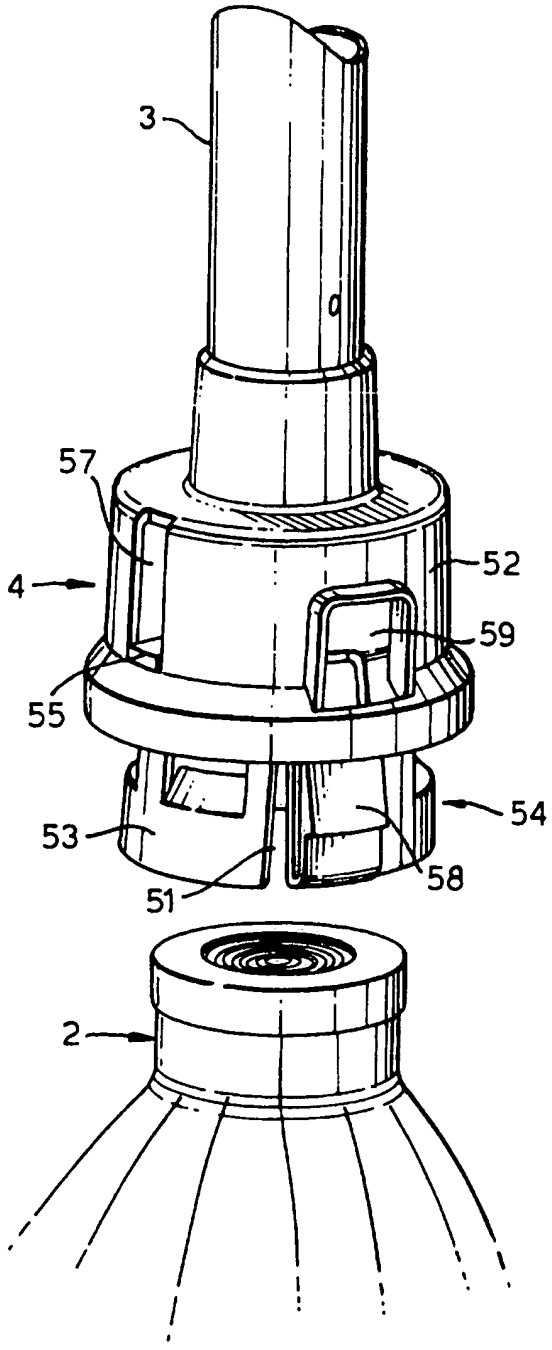


Fig.14.

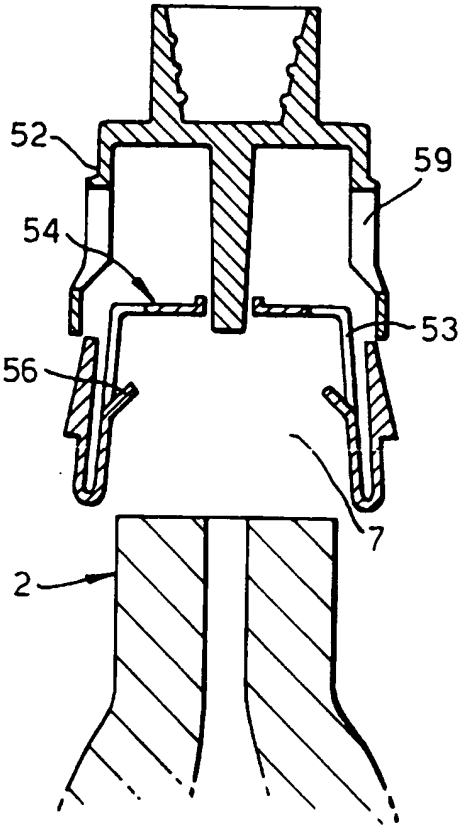


Fig.15.

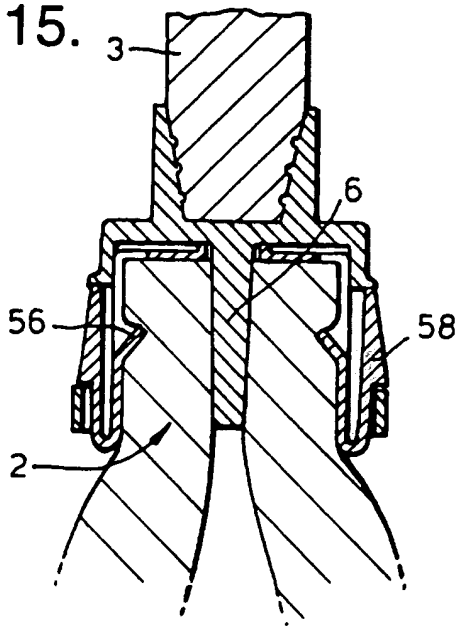


Fig.16.

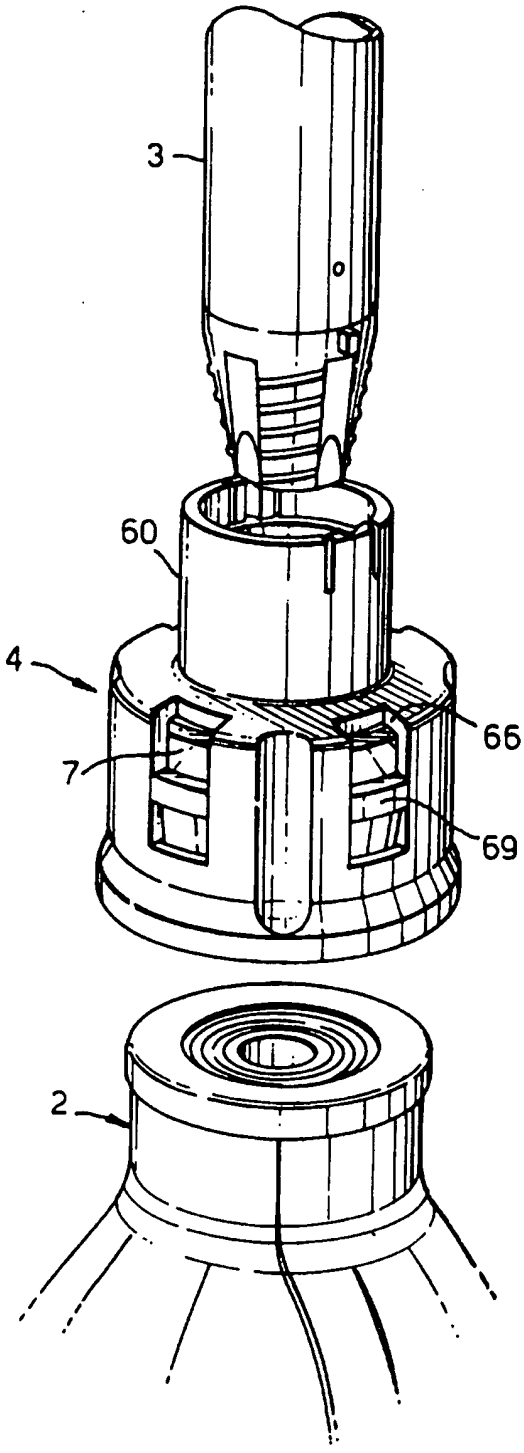


Fig.17.

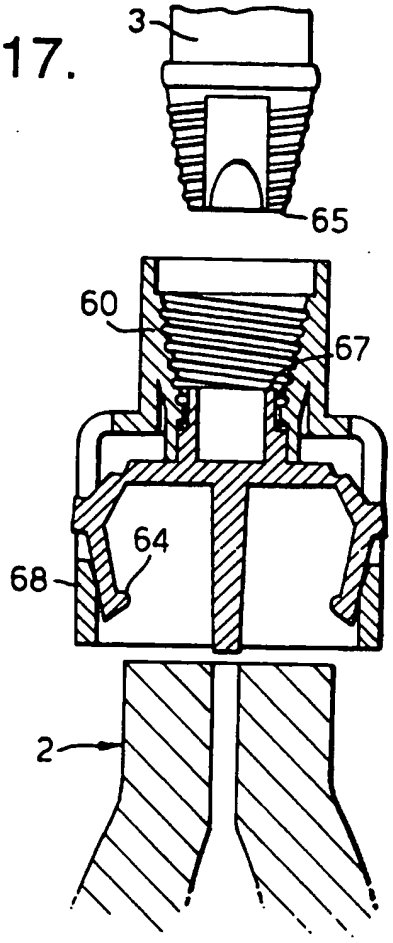
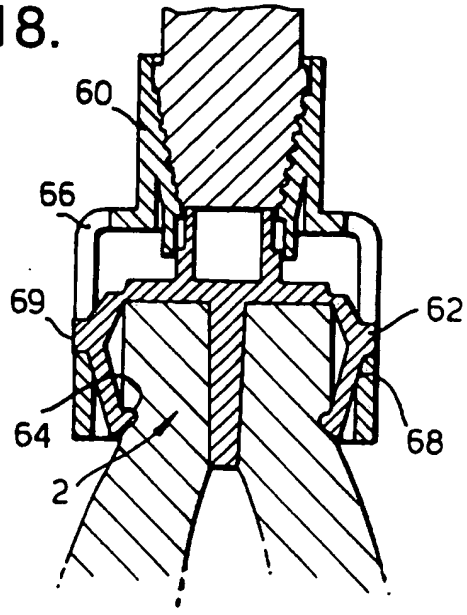


Fig.18.



INTERNATIONAL SEARCH REPORT

Inter al Application No
PCT/GB 95/02171

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A47L13/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,1 430 988 (A. HARRIS) 3 October 1922 see the whole document	1,12,13, 15
A	GB,A,1 260 859 (J.E. COOMBES) 19 January 1972 see page 1, line 45 - page 2, line 75; figures	1,12,13, 15
A	US,A,5 172 447 (E. TOMM) 22 December 1992 see column 3, line 5 - column 4, line 50; figures	1,12,13, 15
A	WO,A,92 14064 (D. HARRAH) 20 August 1992 see abstract; claims; figures	1,12,13, 15

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
1 December 1995	13.12.1995

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016	Vanmol, M

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INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/GB 95/02171

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO,A,93 14687 (LOGIC-BRAVE LTD) 5 August 1993 see claims; figures	1,12,13, 15
A	EP,A,0 537 963 (UNILEVER PLC) 21 April 1993 see column 3, line 4 - line 31; figure 2	1

1

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INTERNATIONAL SEARCH REPORT

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PCT/GB 95/02171

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US-A-1430988	03-10-22	NONE		
GB-A-1260859	19-01-72	NONE		
US-A-5172447	22-12-92	NONE		
WO-A-9214064	20-08-92	US-A-	5207754	04-05-93
		AU-B-	1454492	07-09-92
		US-A-	5375286	27-12-94
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